

Position on Woody Biomass as an Energy Source

in relation to the role of

Forests in Climate Change Mitigation and Adaptation

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Position

Mass Audubon recognizes that there is a role for burning of clean woody biomass¹ to produce heat and electricity within the Commonwealth's overall diversified energy mix. However, we have significant concerns about greenhouse gas emissions and impacts to forests associated with large scale biomass use. Mass Audubon opposes the permitting, construction, and operation of electric generation woody biomass facilities until the following regulatory changes have been put in place:

1. The Massachusetts Forest Cutting Practices regulations must be refined to ensure that forest harvesting, including any extraction of woody biomass, is sustainable and minimizes negative effects on forest carbon storage and sequestration, habitat, water quality, and other ecosystem services provided by forests.
2. Federal and state renewable energy regulations and tax credit programs must be modified so that biomass facilities only receive financial incentives to the extent a facility produces more energy per unit of carbon emitted than the average fossil fuel plant. Regulations must distinguish between the use of biomass as an energy source that releases carbon and other pollutants into the environment versus other renewable energy options such as solar or wind that do not produce emissions.

Mass Audubon also calls for the Commonwealth of Massachusetts to establish a no net loss of forests policy and initiatives that would help the state achieve that goal.

Background

The disruptive effects of rapid climate warming present major threats to the Commonwealth's land conservation efforts, wildlife, and the planet. Climate change also presents serious challenges for our economy, security, and health. It will lead to rising sea levels and alteration of habitats all over the world. Scientific consensus is that human inputs of greenhouse gases such as CO₂ and methane must be reduced rapidly to slow and reverse climate change (<http://www.ipcc.ch/>). Energy efficiency and conservation are proven, cost-effective measures and should receive a high level of immediate attention and funding at all levels of government, but these measures alone will not fully address climate change. At the same time we must responsibly develop clean energy sources. All energy sources have environmental impacts, and we need to focus development on those that have the lowest levels of impact.

Biomass is any organic material derived from plants or animals that can be burned to produce heat and/or electric power. There are many types of biomass ranging from agricultural waste, to plants or algae grown specifically for this purpose, to woody material from forests or other sources. Biomass fuel

¹ Not construction and demolition debris, which involves additional environmental concerns including air quality.

may be in a solid or liquid form. The details of biomass sources and methods of utilization is complex². Our position focuses on clean woody biomass from trees and other woody vegetation grown in Massachusetts or the New England Region. Some of this material is derived from construction-related land clearing, urban yard waste, utility line and roadside maintenance, and sawmill waste. As the scale of demand for woody biomass use for electric power production exceeds the quantities available from these sources, additional harvesting from forests would be required.

Biomass has been burned for heating and cooking for thousands of years. More recently it is being used to produce electric power, or in facilities that produce a combination of heat and power (CHP). Many homeowners use wood pellet stoves or small outdoor wood furnaces to heat their homes. As the scale of biomass use has increased, numerous concerns have been raised about adverse effects, particularly from utility-scale biomass burning, on forests, rivers and air quality including the emission of greenhouse gases.

Burning of biomass has been widely promoted as one of the solutions to climate change, under the assumption that it is “carbon neutral,” i.e. that any carbon released is offset by carbon uptake by trees and other plants. This view states that carbon in biomass is part of the active biosphere that recycles carbon naturally within living systems, unlike fossil fuels which, when burned, release carbon that otherwise would remain permanently stored underground. However, this assumption is challenged by available science³. Many factors determine the degree and rate at which carbon released from biomass is actually offset by recapture by plants. As a practical matter, the atmosphere does not distinguish between greenhouse gases released from biological sources vs. fossil fuels. Carbon released into the air contributes to climate change regardless of the source, since uptake by plants remains at the same level or decreases following biomass harvest.

In particular, Mass Audubon has concerns about several pending proposals to construct utility-scale facilities that generate power at low efficiencies. These facilities would emit 1.5 times or more CO₂ per unit generated than the average coal plant. Each plant would require annual harvesting of wood from 10,000 acres or more of land, and if all are constructed the rate of forest harvesting in Massachusetts is likely to quadruple over recent trends. The Massachusetts Department of Environmental Protection’s Baseline Report on greenhouse gas emissions⁴ estimates that forests in Massachusetts sequester 8.6 million metric tons of CO₂ per year. Most forests in Massachusetts are relatively mature and contain large stocks of stored carbon. Peer reviewed studies indicate that mature and old growth forests continue to increase their carbon storage over long periods of time, up to hundreds of years⁵. Even selective harvesting of forests will usually release some carbon into the atmosphere while simultaneously reducing the rate of carbon sequestration in that forest for several years.

CHP biomass facilities are a more efficient use of biomass than utility-scale facilities that produce only electric power. Even so, the emissions from CHP plants should be calculated and renewable credits provided only to the extent these facilities are more efficient than a fossil fuel plant in terms of energy produced per amount of carbon emitted. Emissions from residential uses of biomass such as firewood and pellet stoves are more difficult to regulate. High standards should be established for sale of new equipment to minimize the full range of air pollutants since cumulative impacts may be high as popularity of such options increases.

² <http://www.nrel.gov/biomass/>

³ Searchinger, Timothy D. et. al., *Fixing a Critical Climate Accounting Error*, Science **326**, 527-528 (2009).

⁴ http://www.mass.gov/dep/air/climate/gwsa_docs.htm

⁵ Luyssaert, Sebastiaan, et. al. *Old-growth Forests as Global Carbon Sinks*, Nature **455**, 213-215 (2008).

See also various publications by Harvard Forest at: <http://harvardforest.fas.harvard.edu/publications.html>

Furthermore, the impacts of greatly increased forest harvesting on wildlife habitat, water quality, and other ecosystem service values of forests are of concern. Utility-scale biomass facilities are also similar to fossil fuel power plants in that they evaporate hundreds of thousands of gallons of water daily for cooling. The remaining water is discharged at higher temperatures and reduced quality, potentially further stressing rivers and streams already suffering from multiple sources of stress including a warming climate.

Recommendations

Mass Audubon calls for the modification of federal and state laws and regulations to take into account the contributions of biomass energy to greenhouse gas emissions. Biomass facilities should only receive renewable energy production credits to the extent they produce energy at lower levels of greenhouse gas emissions than the average fossil fuel source. Given the urgency of reducing greenhouse gases in the atmosphere, we cannot afford a carbon accounting system that assumes material taken from forests and burned now is carbon neutral if it is reabsorbed at some point years or even decades in the future.

In addition to better regulation of the emissions from biomass facilities, Mass Audubon supports strengthening of the Forest Cutting Practices regulations in Massachusetts to improve public and private forest management practices statewide. Any extraction of woody biomass for energy production should be subjected to strong safeguards on forest harvesting methods. Rules for forest cutting for any purpose should protect the full range of forest functions and values carbon storage, habitat, forest nutrients, and water quality.

Mass Audubon is also concerned about permanent losses of forestland to sprawling development patterns⁶. Permanent protection of large blocks of intact forestland in forest reserves and sustainably managed woodlands is important⁷. This will not only preserve the role of forests in capturing carbon, but also will help ensure the integrity and resilience of our forests and the other ecosystems imbedded within in them (e.g. wetlands and rare species habitats) in responding to the inevitable effects of climate change already underway. Mass Audubon supports protection of forests to maintain their carbon sequestration and ecosystem service functions. We recommend that the Commonwealth of Massachusetts institute a no net loss of forests policy, and develop programs and incentives to achieve that goal.

⁶ Mass Audubon, *Losing Ground: Beyond the Footprint*, 2009. www.massaudubon.org/losingground

⁷ Harvard Forest, *Wildlands and Woodlands*, 2005. www.wildlandsandwoodlands.org